The headquarters and staff residences for Arches National Park are located about 1.2 miles northwest of the Moab site. No residences or residential areas, other than those identified above, are known to be located within 2 miles of the site.

3.1.13 Cultural Resources

3.1.13.1 Cultural History of Southeastern Utah

The earliest known humans to inhabit southeastern Utah were believed to have arrived around 10,000 B.C. These paleoindian people were nomadic hunters of large game animals, which at that time included the mammoth, horse, camel, bison, and giant sloth. Stone weapon points from this period have been found in southeastern Utah. These hunters were believed to have migrated out of the area soon after the end of the Pleistocene (Berry 2003).

From 7800 to approximately 500 B.C., Archaic people inhabited southeastern Utah. These were hunter-gatherers who depended more on small game and plants for subsistence. Sometime after 2000 B.C., agriculture was adopted by many of the Archaic people, and a more sedentary, group-oriented lifestyle began. A number of archaeological sites containing evidence of Archaic-age tools, weapons, and structures have been discovered throughout southeastern Utah.

With the advent of horticulture, populations of tribal groups within the southeastern Utah area expanded and diversified. Between A.D. 1 and 1300, several distinct cultural groups inhabited the area, the best known of which were the Anasazi and Fremont. Grand County is thought to have been the northern limit of Anasazi habitation, although some rock art and pottery remains have been found in the Moab and Arches National Park areas. The Fremont group is believed to have inhabited areas primarily north of Moab. Numerous lithic sites, granaries, and storage pits have been found in the area between Arches National Park and the Book Cliffs. The abundant pictographs and petroglyphs discovered throughout southeastern Utah derive from the Anasazi and Fremont people. Both of these groups abandoned the Four Corners region between A.D. 1250 and 1400.

The ancestors of the present-day Ute and Southern Paiute tribes entered southeastern Utah about A.D. 1200. They were mainly hunter-gatherers who hunted and traveled in small bands composed of two to two dozen individuals. By the time Anglo-Americans arrived in southeastern Utah, the San Juan Southern Paiutes and several bands of Utes were well established in the area.

The Ute people were closely tied to the land, not so much through agriculture but through hunting and gathering; thus, their survival depended heavily upon having complete access to the land (Cuch 2000).

In the late 1800s and early 1900s, their free-roaming lifestyle ended when the Utes were removed from their ancestral lands and forced onto reservations. Today, the Ute bands that once roamed the lands of southeastern Utah are concentrated in reservations in a number of areas: the White Mesa Ute community 9 miles south of Blanding, Utah; the Ute Mountain Utes in Towaoc, Colorado; the Southern Utes in Ignacio, Colorado; and the Northern Utes in White Rocks, Fort Duchesne, and Randlett, Utah.

The Navajos migrated into the Four Corners region sometime between A.D. 900 and 1400. In San Juan County, the earliest known Navajo site, discovered in White Canyon (adjacent to the

Colorado River and west of Blanding), is estimated to be 380 years old. Several Spanish maps dating from the 1660s pictured Navajo territory as far north as the present-day town of Green River, Utah (Cuch 2000). However, the primary homeland of the early Navajos was in a large area known as Dinétah, located southeast of present-day Farmington, New Mexico.
In 1868, a treaty was signed between the Navajos and President Andrew Johnson that allowed the Navajos to return to their homeland. Today, 110 chapters of the Navajo Nation are located in northern Arizona, northwestern New Mexico, and southeastern Utah. The Aneth and Red Mesa Chapters in southeastern Utah are approximately 30 and 45 miles, respectively, southeast of the White Mesa Mill site.

Spanish explorers and traders traveled through southeastern Utah from the late 1600s to about 1848, when Mexico ceded to the United States the tract of land south of the forty-second parallel, including the state of Utah. The best known of the explorers were Juan María Antonio de Rivera, who traveled the area in 1765, and Francisco Atansio Domínguez and Francisco Silvestre Vélez de Escalante, who traveled the area in 1776. During this period, the Old Spanish Trail was developed as a major trade route between California and Santa Fe, New Mexico Highway. I-70 to Denver and the Union Pacific Railroad line follow the northern branch of this route, and US-191 from Crescent Junction to Blanding follows the historic main branch of the trail (Berry 2003).

The first Anglo-Americans to settle the southeastern Utah area were Mormon missionaries. They came in 1855 to convert the Utes to Mormonism and teach them farming. During their brief stay at the Elk Mountain Mission, which they constructed north of present-day Moab, they raised cattle and grew crops. Their efforts were soon thwarted by conflicts with the Utes, and they departed the area "in haste" about 4 months after their arrival. Mormon farmers and ranchers did not permanently settle southeastern Utah until 1877, when the United States signed a peace treaty with the Ute Tribe and established reservations in eastern Utah and southwestern Colorado (Firmage 1996).

Prospectors settled in the Moab area between the 1880s and 1920s to mine gold, copper, uranium, and radium. Moab, Grand County, and southeastern Utah were forever changed by a uraninite discovery on July 6, 1952, by Texas prospector Charles A. Steen. His strike was the richest single lode of uranium ore discovered anywhere to that date and led to Moab becoming the "Uranium Capital of the World." Steen built his own $8 million processing mill on the north side of the Colorado River 3 miles north of Moab in 1956. In 1962, the Atlas Corporation purchased Steen's mill for $25 million and operated it until it closed in April 1984. This mill operation generated the tailings pile that is the subject of this document (NRC 1999).

3.1.13.2 Cultural Resource Inventories of Potentially Affected Areas

DOE contracted two professional archaeological consultants to conduct Class I cultural resource inventories of areas that could be affected by the proposed alternatives (Berry 2003; Davis et al. 2003). Class I inventories are inventories of existing cultural resource data. Archaeologists study published and unpublished documents, records, files, and other sources to determine if previous cultural resource investigations have been conducted within an area. If cultural resources have been identified, the federal agency conducting the action, in consultation with the State Historic Preservation Officer and affected Native American tribes, determine whether the cultural resources are included or are eligible for inclusion in the National Register of Historic Places. DOE is required by the National Historic Preservation Act to consider the effects of its actions on any "district, site, building, structure, or object" that is included or eligible for inclusion in the

National Register of Historic Places. If DOE's action would have an adverse effect on an eligible cultural resource, DOE would be required to implement a process called the Section 106 consultation process. This process would require DOE to consult with the State Historic Preservation Officer and others in an effort to find ways to make the action less harmful. Others who would be consulted might include Native American tribes, BLM, NPS, UDOT, Bureau of Indian Affairs, and other federal and state agencies, organizations, and private individuals.

The National Historic Preservation Act also requires DOE to inventory surface and subsurface cultural resource sites in areas before they are disturbed. These on-the-ground "Class III" surveys would be conducted by professional archaeologists before DOE implemented any of the proposed alternatives. A Class III survey is "a continuous, intensive survey of an entire target area, aimed at locating and recording all archaeological properties that have surface indications, by walking close-interval parallel transects until the area has been thoroughly examined" (BLM 2003a).

Some culturally significant properties or places may be eligible for inclusion in the National Register of Historic Places but may not be readily identifiable by archaeologists during a Class I inventory or Class III survey. These "traditional cultural properties" may be associated with the cultural practices or beliefs of a community and may be significant to the community's history or may be important in maintaining the community's cultural identity. The National Historic Preservation Act requires that these properties or places be considered by federal agencies in the same manner as other eligible cultural resources through the Section 106 consultation process. To identify traditional cultural properties that may be affected by its proposed actions, DOE contracted a cultural anthropologist to assist in communicating with tribal members who may have knowledge of such properties. Because Class III cultural resource surveys have not yet been completed in many portions of the project area, all potential traditional cultural properties cannot yet be identified. Information contained in this EIS concerning traditional cultural properties is preliminary and not complete. Once a preferred alternative is selected, site-specific studies and additional interviews would be conducted in conjunction with the Class III surveys to identify all potential traditional cultural properties.

3.1.13.3 Section 106 Consultation Process

In April 2003, DOE initiated the Section 106 consultation process by notifying potentially interested stakeholders that DOE was preparing this EIS. DOE contacted federally recognized Native American tribes that resided in or had cultural ties to the project area to inform them of DOE's proposed alternatives and to solicit their concerns or comments. A total of 38 representatives from 14 Native American tribes and the Navajo Utah Commission were contacted by mail and telephone. To date, the Ute Mountain Ute Tribe (including White Mesa Ute Tribe), Southern Ute Tribe, Uintah-Ouray Ute Tribe, Navajo Nation (including Aneth Chapter, Red Mesa Chapter, and Oljato Chapter), Navajo Utah Commission, and Hopi Tribe have expressed interest in or concerns with DOE's proposed alternatives.

DOE also contacted potentially affected federal agencies, including BLM, NPS, Bureau of Indian Affairs, and UDOT about the proposed alternatives. BLM and NPS are cooperating agencies for the EIS.

3.1.13.4 Moab Site Inventory Results

DOE contracted a Class III cultural resource survey of the Moab site in January and March 2004 (Christensen 2004; Christensen and Lindsay 2004 [in progress]). As a result of that survey, DOE determined that five cultural sites eligible for inclusion in the National Register of Historic Places are present on DOE property. The eligible sites include (1) a prehistoric site, (2) a section of the historic US-160 that parallels and pre-dates the present-day US-191, (3) a sign identifying the historic livestock driveway from Moab to Crescent Junction, (4) a collapsed farmstead dating from the Depression era, and (5) the remaining structures associated with the uranium mill. The primary contributing features associated with the historic millsite include the Uranium Reduction Company general office/warehouse/machine shop, Colorado River pump station and pipeline, ore loadout structure on the railroad spur, and scale house. Although the millsite features are less than 50 years old, DOE determined that they are eligible for nomination to the National Register of Historic Places, primarily because of their association with the "greatest mining boom in American history" (Christensen 2004), a boom that facilitated the Unites States' dominance as a nuclear superpower. The features also are "representative of the uranium milling industry that brought many jobs to Grand County, contributing to the current community structure of Moab to a degree far greater than any other single mechanism in regional history" (Christensen 2004).

One recorded traditional cultural property associated with the Ute Tribe is present near the Moab site (Berry 2003).

3.1.14 Noise and Vibration

Noise is technically defined as sound waves that are unwanted and perceived as a nuisance by humans. Sound waves are characterized by frequency and measured in hertz (Hz); sound pressure is expressed as decibels (dB). Humans have a perceptible hearing range of 31 to 20,000 Hz. The threshold of audibility ranges from about 60 dB at a frequency of 31 Hz to less than about 1 dB between 900 and 8,000 Hz. For regulatory purposes, noise levels for perceptible frequencies are weighted to provide an A-weighted sound level [dBA] that correlates highly with individual community response to noise. Sound pressure levels outside the range of human hearing are not considered noise in a regulatory sense, even though wildlife may be able to hear at those frequencies. A better understanding of noise impacts is facilitated by associating noise levels with common activities or sources (Figure 3–19).

Noise levels are often reported as the equivalent sound level (L_{eq}). The L_{eq} is expressed in dBA over a specified period of time, usually 1 or 24 hours. The L_{eq} is the equivalent steady sound level that, if continuous during

Noise Measurement

What are *sound* and *noise*?

When an object vibrates it possesses energy, some of which transfers to the air, causing the air molecules to vibrate. The disturbance in the air travels to the eardrum, causing it to vibrate at the same frequency. The ear and brain translate the vibration of the eardrum to what we call *sound*. *Noise* is simply unwanted sound.

How is sound measured?

The human ear responds to sound pressures over an extremely wide range of values. The range of sounds people normally experience extends from low to high pressures by a factor of 1 million. Accordingly, scientists have devised a special scale to measure sound. The term decibel (abbreviated dB), borrowed from electrical engineering, is the unit commonly used.

Another common sound measurement is the A-weighted sound level, denoted as dBA. The A-weighting accounts for the fact that the human ear responds more effectively to some frequencies than others. Higher frequencies receive less weighting than lower ones. Most of the sound levels provided in this report are A-weighted; however, some are in decibels because of lack of information on the frequency spectrum of the sound. Figure 3–19 shows common references to sound on the A-weighted sound-level scale.